

V. REMARKS

Claims 1-13 are rejected under 35 USC 102 (b) as being anticipated by Bartlett et al. (U.S. Patent No. 5,375,424). The rejection is respectfully traversed.

Bartlett teaches a cryopump that includes at least first and second stages in a cryopump chamber, a second stage heating element, a warm purge gas valve, a roughing valve and an electronic controller. The at least first and second stages in a cryopump chamber are cooled by a cryogenic refrigerator with an adsorbent on the second colder stage. The second stage heating element heats the second stage. The warm purge gas valve applies purge gas to the cryopump chamber. The roughing valve couples the cryopump chamber to a roughing pump. The electronic controller controls the heating element, purge gas valve and roughing valve. The controller is programmed to control a partial regeneration process while continuing operation of the cryogenic refrigerator by heating the second stage of the cryopump; cycling between application of purge gas to the cryopump and opening of a roughing valve from the cryopump until the cryopump is sufficiently empty of gases condensed and adsorbed on the second stage; maintaining the roughing pump open to reduce pressure of the cryopump while continuing heating of the second stage; stopping heating of the second stage and continuing rough pumping of the cryopump with the roughing valve open to further reduce pressure of the cryopump; closing the roughing valve at a base pressure level; and, cyclically opening and closing the roughing valve as the cryopump cools down to maintain the pressure of the cryopump near to the base pressure level.

Claim 1, as amended, is directed to a water regeneration method for discharging ice condensed in a portion cooled by a cryogenic refrigerator installed in a case to an outside of the case. Claim 1 recites:

a temperature increasing step for melting the ice into water at approximately atmospheric pressure;

a vaporizing step for vaporizing water by performing a plurality of first roughing steps between the approximate atmospheric pressure and a first reduced pressure being less than the atmospheric pressure but higher than and yet close to a water-freezing pressure that causes the water to freeze;

a water discharge step for discharging water by performing a plurality of second roughing steps between a second reduced pressure and the first reduced pressure, the second reduced pressure being less than the atmospheric pressure and greater than the first reduced pressure; and

a water vapor discharging step for discharging water vapor by performing a plurality of third roughing steps between a third reduced pressure and a fourth reduced pressure, the third and fourth reduced pressures being less than the first reduced pressure and the third reduced pressure being greater than the fourth reduced pressure.

It is respectfully submitted that the rejection is improper because the applied art fails to teach each and every element of claim 1 as amended. Specifically, it is respectfully submitted that the applied art fails to teach a combination of the claimed steps, namely a vaporizing step for vaporizing water by performing a plurality of first roughing steps between the approximate atmospheric pressure and a first reduced pressure being less than the atmospheric pressure but higher than and yet close to a water-freezing pressure that causes the water to freeze; a water discharge step for discharging water by performing a plurality of second roughing steps between a second reduced pressure and the first reduced pressure with the second reduced pressure being less than the atmospheric pressure and greater than the first reduced pressure; and, a water vapor discharging step for discharging water vapor by performing a plurality of third roughing steps between a third reduced pressure and a fourth reduced pressure with the third and fourth reduced pressures being less than

the first reduced pressure and the third reduced pressure being greater than the fourth reduced pressure.

As a result, it is respectfully submitted that claim 1 is allowable over the applied art.

Claim 10, as amended, is directed to a water regeneration apparatus for discharging ice condensed in a portion cooled by a cryogenic refrigerator installed in a case to an outside of the case. Claim 10 recites that the water regeneration apparatus includes temperature increasing means, vaporizing means, water discharge means and water vapor discharging means. Claim 10 recites that the temperature increasing means melts the ice into water at approximately atmospheric pressure and the vaporizing means vaporizes the water by performing a plurality of first roughing steps between the approximate atmospheric pressure and a first reduced pressure being less than the atmospheric pressure but higher than and yet close to a water-freezing pressure that causes the water to freeze. Claim 10 also recites that the water discharge means discharges water to the outside of the case by performing a plurality of second roughing steps between a second reduced pressure and the first reduced pressure with the second reduced pressure being less than the atmospheric pressure and greater than the first reduced pressure. Further, claim 10 recites that water vapor discharging means discharges water vapor by performing a plurality of third roughing steps between a third reduced pressure and a fourth reduced pressure with the third and fourth reduced pressures being less than the first reduced pressure and the third reduced pressure being greater than the fourth reduced pressure.

It is respectfully submitted that the rejection is improper because the applied art fails to teach each and every element of claim 10 as amended. Specifically, it is respectfully submitted that the applied art fails to teach the combination of vaporizing means the vaporizes the water by performing a plurality of first roughing steps

between the approximate atmospheric pressure and a first reduced pressure being less than the atmospheric pressure but higher than and yet close to a water-freezing pressure that causes the water to freeze, water discharge means that discharges water to the outside of the case by performing a plurality of second roughing steps between a second reduced pressure and the first reduced pressure with the second reduced pressure being less than the atmospheric pressure and greater than the first reduced pressure and water vapor discharging means discharges water vapor by performing a plurality of third roughing steps between a third reduced pressure and a fourth reduced pressure, the third and fourth reduced pressures being less than the first reduced pressure and the third reduced pressure being greater than the fourth reduced pressure.

As a result, it is respectfully submitted that claim 10 is allowable over the applied art.

Support for these proposed amendments is found in the specification on page 5, line 4 through page 6, line 10 as well as in Figure 7.

Furthermore, regeneration of Bartlett is “a partial regeneration process” (column 5, line 1) in which regeneration is conducted without raising the temperature up to room temperature (300 K). Therefore, temperature control at low temperatures, i.e., 300 K or 175 K, is necessary in Bartlett.

In contrast thereto, temperature control of the present invention is conducted up to room temperature (300 K) as apparent from the right axis of Figure 7, and is not “the partial regeneration of Bartlett.

Claims 2-9 depend from claim 1 and include all of the features of claim 1. Thus, it is respectfully submitted that the dependent claims are allowable at least for the reason claim 1 is allowable as well as for the features they recite.

Claims 11-13 depend from claim 10 and include all of the features of claim 10. Thus, it is respectfully submitted that the dependent claims are allowable at least for the reason claim 10 is allowable as well as for the features they recite.

Withdrawal of the rejection is respectfully requested.

Newly-added claim 14 also includes features, including the subdivisional process, that are not shown in the applied art.

It is respectfully submitted that the pending claims are believed to be in condition for allowance over the prior art of record. Therefore, this Amendment is believed to be a complete response to the outstanding Office Action. Further, Applicant asserts that there are also reasons other than those set forth above why the pending claims are patentable. Applicant hereby reserves the right to set forth further arguments and remarks supporting the patentability of their claims, including the separate patentability of the dependent claims not explicitly addressed herein, in future papers.

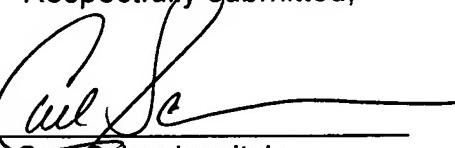
In view of the foregoing, reconsideration of the application and allowance of the pending claims are respectfully requested. Should the Examiner believe anything further is desirable in order to place the application in even better condition for allowance, the Examiner is invited to contact Applicant's representative at the telephone number listed below.

Should additional fees be necessary in connection with the filing of this paper or if a Petition for Extension of Time is required for timely acceptance of the same,

the Commissioner is hereby authorized to charge Deposit Account No. 18-0013 for any such fees and Applicant(s) hereby petition for such extension of time.

Respectfully submitted,

By:

  
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Enclosure(s):      Amendment Transmittal

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